

## HETEROCERA.

## LITHOSIIDÆ.

## DEIOPEIA, Stephens.

## 6. DEIOPEIA PULCHELLA.

*Tinea pulchella*, Linnæus, Syst. Nat. 1, ii. p. 884 (1766).

Larger than Australian specimens, and with the red dashes on the primaries broader and longer.

## OPHIUSIDÆ.

## ACHÆA, Hübner.

## 7. ACHÆA MELICERTE.

*Phalæna-Noctua melicerte*, Drury, Ill. Ex. Ent. i. p. 46, pl. 23. fig. 1. (1770).

One worn example was obtained of this widely distributed moth.

3. Notes on the *Penæidæ* in the Collection of the British Museum, with Descriptions of some new Species. By EDWARD J. MIERS, F.L.S., F.Z.S., Zoological Department, British Museum.

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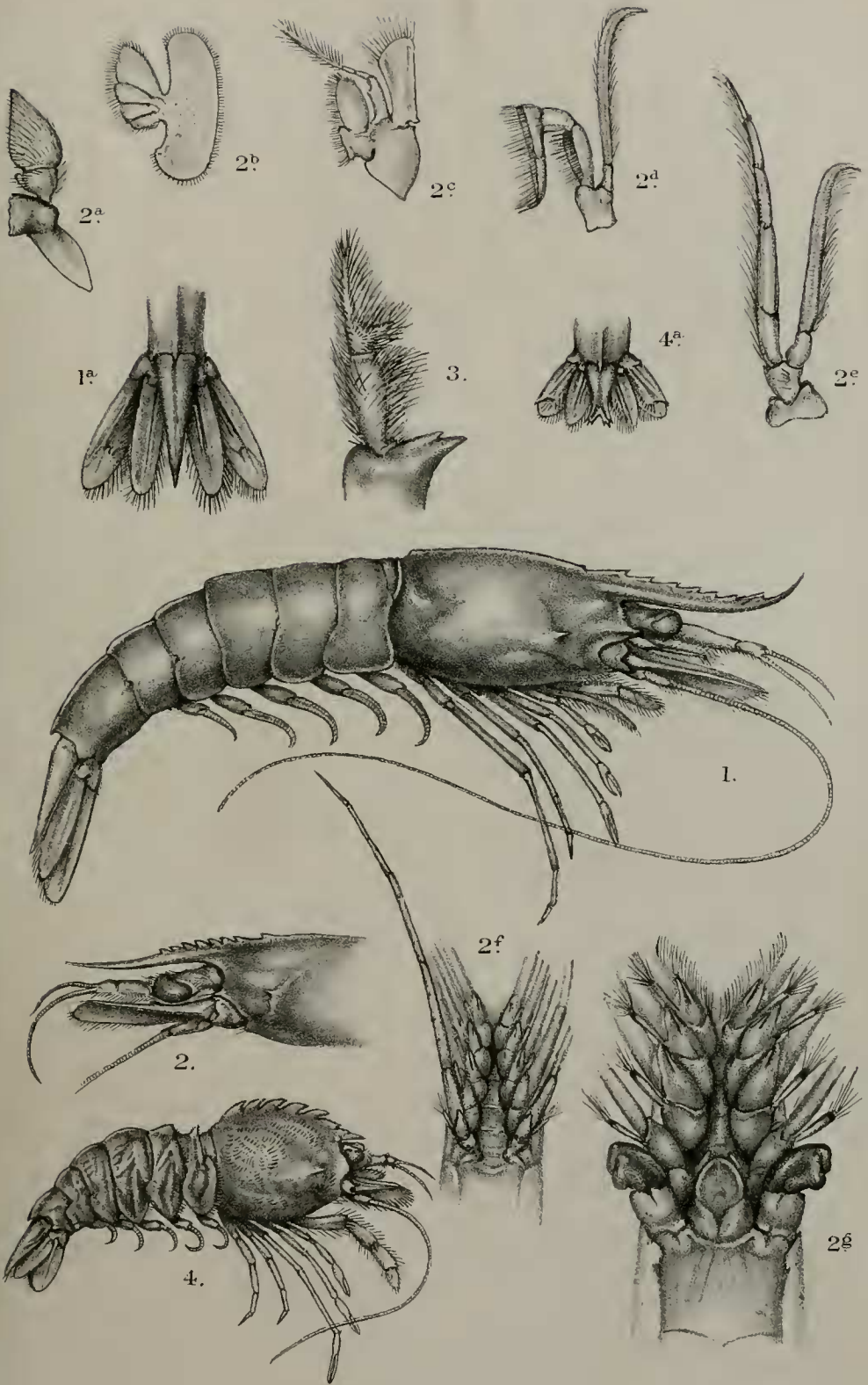
(Plate XVII.)

Mr. G. E. Dobson, M.B., F.L.S., lately presented to the Trustees of the British Museum a remarkable specimen of *Penæus*, with the request that I should lay a description of it before the Society. In studying the affinities of this form, which is described below under the name of *P. dobsoni*, I found it necessary to revise the characters of the whole of the species of this large and difficult genus; and although the materials existing in the national collection are not rich enough at present to permit of a complete review of the subject, it is hoped that the following notes on the species in the collection will contribute toward the elucidation of the genus, while the synoptical key to the genus appended will serve to indicate what appear to be the principal distinctive characters of the different species, and to mark what are *desiderata* in the collection of the British Museum. I have added some remarks upon the *Funchalia woodwardi*, and on the *Penæus edwardsianus* of Mr. J. Y. Johnson, showing that this latter species must be referred to the genus *Aristeus* of Duvernoy; also a description of a species of *Sicyonia* not hitherto recorded.

## PENÆUS CANALICULATUS.

*Palæmon canaliculatus*, Olivier, Encycl. Méth. Hist. Nat. viii. p. 660 (1811).

*Penæus canaliculatus*, M.-Edw. Hist. Nat. Crust. ii. p. 414 (1837); De Haan, Faun. Japon. Crust. p. 190 (1849).





*Penæus marginatus*, Randall, Journ. Ac. Nat. Sci. Phil. viii. p. 146 (1839).

? *Penæus plebejus*, Hess. Arch. f. Nat. p. 168, pl. vii. fig. 19 (1865).

The series in the British-Museum collection includes specimens from the Gulf of Suez, Shanghai, Yokohama (Japan), Torres Straits, Shark Bay, Houtmann's Abrolhos, Sir-C.-Hardy Island, and the Loyalty Islands (Lifu). In both sexes there is a single spine on the second joint of the first and second pairs of legs, and none on the third pair of legs. In the closely allied European *P. caramote* there is, besides these spines, a spine upon the first joint of each of the first three pairs of legs. The sixth postabdominal segment is not sulcate in either species; and in both the terminal segment is armed with lateral marginal spines.

#### PENÆUS BRASILIENSIS.

*Penæus brasiliensis*, Latr. Nouv. Dict. Hist. Nat. xxv. p. 256 (1817); M.-Edw. Hist. Nat. Crust. ii. p. 414 (1837); Stimpson, Ann. Lyc. Nat. Hist. New York, x. p. 132 (1871).

This species in external characters closely resembles the preceding, but differs in the following particulars:—There is a spine upon the second and third joints of the first pair of legs, one upon the second joint of the second pair of legs, and none upon the third pair of legs. The sixth postabdominal segment is grooved on either side of the longitudinal median carina on its upper surface. There are no spines on the lateral margins of the seventh postabdominal segment.

Specimens from Whydah on the west coast of Africa agree in all respects with authentic specimens from Brazil presented by the Paris Museum, and with specimens from the West Indies (Barbadoes) and North America, proving that this, like many other species, occurs on both sides of the Atlantic.

#### PENÆUS SEMISULCATUS.

*Penæus semisulcatus*, De Haan, Faun. Japon. Crust. p. 191, pl. xlv. fig. 1 (1849).

A large series of specimens of both sexes is in the Museum collection, agreeing with De Haan's description and figure. It is probable that under the Fabrician name of *P. monodon* two closely allied but apparently distinct species were confounded by earlier authors. In *P. semisulcatus* the rostrum is 7-8-toothed above and 3-toothed below, the dorsal carina, which is faintly or obsoletely canaliculated, extends to the posterior margin of the carapace, and the gastro-hepatic sulcus is faintly defined. There are examples from India (Pondicherry, Calcutta), Formosa, the Philippines, North Australia, and the Fiji Islands (Mbau), in the Museum collection.

In two specimens from Australia (Shark Bay), and one from Ceylon, the rostrum is 6-7-toothed above, the teeth toward the apex separated by much wider intervals than in the specimens referred to



*P. semisulcatus*, there is a short dorsal carina which does not reach to the posterior margin of the cephalothorax and is not canaliculated above, and the gastro-hepatic sulcus is very deep and strongly defined. For this latter form I propose to retain Fabricius's name of *P. monodon*, if the two species be distinct; as it would seem that the common Indian form must be designated by De Haan's name of *P. semisulcatus*, it having been first distinctly characterized by him, while it is impossible to ascertain from Fabricius's brief description which of the two species was known to that author.

The figure of *P. tahitensis* of Heller (Reise der Novara, Crust. p. 121, pl. xi. fig. 2, 1865) resembles this species; and in it the rostrum is represented as 3-toothed below; but it is described as edentate; so I cannot refer it with certainty to *P. semisulcatus*.

The *P. carinatus* of Dana (U.S. Expl. Exp. xiii., Crust. i. p. 602, pl. xl. fig. 2, 1852), from Singapore, is only briefly described, but appears to be identical with *P. semisulcatus*, with which it agrees in the form and number of the teeth on the rostrum. It is not, however, mentioned in the description whether the longitudinal carina on the cephalothorax is sulcate or not.

PENÆUS HARDWICKII, sp. n. (Plate XVII. fig. 1.)

The cephalothorax is very minutely granulated; the cervical suture is in its posterior half, and the cardiaco-branchial altogether, obsolete; a canaliculated dorsal crest extends from the base of the rostrum to the posterior margin. The rostrum reaches beyond the peduncles of the antennules, is 8-9-dentate above, the last tooth separated by twice the ordinary distance from the preceding; the inferior margin is entire; it is curved regularly upward toward the distal extremity, which is acute. There is a spine on the underside of the second joint of the first and second pairs of legs, and none on the third pair. The form of the sternum is as in the *P. curvirostris* of Stimpson; and the third to sixth postabdominal segments are carinate as in that species. The last postabdominal segment is deeply longitudinally sulcate above, and, as in *P. semisulcatus*, acute at apex, without lateral spines.

*Hab.* Indian Seas? (*Hardwicke*).

There are two specimens in the British-Museum collection, of which the exact locality is not known. This species is most nearly allied to *P. curvirostris*, Stimpson, from Simoda, Japan, but differs in having a canaliculated dorsal crest, and a longer rostrum, which is acute at the extremity; the sutures of the cephalothorax are also much less distinct. From the *P. semisulcatus* of De Haan, which resembles this species in having a single longitudinal dorsal sulcus, it differs in the form of the rostrum, which is edentate below, and in having only a single spine at the base of the first pair of legs,—and from the *P. sculptilis* of Heller, from Java, another unisulcate species, in the longer, more curved rostrum, and in the postabdomen being keeled only on the third to sixth segments, whereas in *P. sculptilis* all the postabdominal segments are said to be keeled.

## PENÆUS INDICUS.

*Penæus indicus*, M.-Edw. Hist. Nat. Crust. ii. p. 415 (1837).

*Penæus stylirostris*, Stimpson, Ann. Lyc. N. H. N. York x. p. 134 (1871).

In specimens in the British-Museum collection from the Indian seas, Ceylon, and Chefoo, which I refer to this species, the first pair of legs are bispinose at base, the second pair unispinose, and the third pair unarmed; there are no lateral marginal spines on the last postabdominal segment. The rostrum in young specimens considerably projects beyond the antennal scale, and the median dorsal carina reaches nearly to the posterior margin of the cephalothorax; in adult specimens, however, the rostrum scarcely projects beyond the antennal scale, and the dorsal carina is nearly obliterated. In one specimen, fully adult, from Amoy, which is probably only a variety of this species, the rostrum is even shorter than the antennal scale, and  $\frac{2}{3}$ -dentate.

I cannot find any valid characters by which to distinguish from this species the *P. stylirostris*, Stimpson, of Panama, of which specimens, from that locality, are in the British-Museum collection.

## PENÆUS MONOCEROS.

*Penæus monoceros*, Fabr. Ent. Syst. Suppl. p. 409 (1798); M.-Edw. Hist. Nat. Crust. ii. p. 415 (1837); De Haan, Faun. Japon. Crust. p. 192, pl. xlv. fig. 2, *P. ensis* (1849); Dana, U.S. Expl. Exp., Crust. i. p. 605, pl. xl. fig. 5 (1852).

Specimens in the British-Museum collection from the Indian seas, Calcutta, Ceylon, and Penang, agree with M.-Edwards's short description, and possess the diagnostic characters indicated by De Haan, but differ from De Haan's longer description in having no lateral marginal spines on the terminal segment. De Haan's specimens belong perhaps to a distinct species, in which case the name of *P. ensis*, as they are designated in the plate, would be applicable to them.

## PENÆUS MEMBRANACEUS.

*Penæus membranaceus*, Risso, Crust. des environs de Nice, p. 98 (1816); Hist. Nat. Eur. Mérid. v. p. 68 (1826); M.-Edw. (part.), Hist. Nat. Crust. ii. p. 417 (1834); Heller, Sitz. Akad. Wissensch. xlv. i. p. 423, pl. ii. fig. 49 (1862); Crust. südl. Europa, p. 296, pl. x. fig. 11 (1863).

*Penæus longirostris*, Lucas, Explor. Sci. Algérie Crust. p. 46, pl. iv. fig. 6 (1849).

*Penæus bocagei*, Johnson, Proc. Zool. Soc. p. 255 (1863), p. 900 (1867).

See Johnson's remarks (P. Z. S. 1867, p. 900) on the complicated synonymy of this species. If Dr. Heller's views are correct, Milne-Edwards attributes to *P. membranaceus* some of the characters of the *Solenocera siphonocera* (*Penæus siphonocerus*, Philippi), subsequently described by Lucas, Ann. Soc. Ent. France, viii. p. 219

(1850), under the name of *Solenocera philippii*. Besides *P. siphonocerus* the *Penæus distinctus* of De Haan (Faun. Japon. Crust. p. 194, 1849) evidently belongs to this genus, and must be designated *Solenocera distincta*. Of it I have seen no specimens.

Perhaps also the *Penæus crassicornis* of Milne-Edwards (Hist. Nat. Crust. ii. p. 418, 1837) from India should be referred here.

PENÆUS DOBSONI, sp. n. (Plate XVII. fig. 2.)

Cephalothorax smooth, not hairy or scabrous, with the cervical, gastro-frontal, and cardiaco-branchial sutures faintly indicated. Antennal and hepatic spines present, but no pterygostomial spine at the antero-inferior angle of the cephalothorax. Rostrum slender, not quite reaching to the apex of the antennal scale, 7-9-dentate above, about four of the teeth being posterior to the frontal margin, the posterior tooth separated by a greater interval than the others, which are equidistant from one another; there are no teeth on the anterior third of the upper margin, nor on the inferior margin; the apex, in the only specimen which appears perfect, is acute. Posteriorly the rostrum is prolonged into a short median dorsal crest, which terminates at some distance from the posterior margin. There are no longitudinal median dorsal *sulci*. The first five postabdominal segments are rounded at their postero-lateral angles; the posterior margins of the first, second, fourth, and fifth have a semicircular notch on each side of the body; there is a longitudinal median dorsal carina on the third to sixth segments, which is but faintly indicated on the third segment, and a faintly indicated lateral carina on each side of the fifth and sixth segments; the terminal segment is longitudinally sulcate above, the extremity very slender and acuminate, the lateral margins ciliated, but without mobile spines; the appendages of the sixth segment somewhat oblong-oval, and narrowed at the distal extremities.

The eyes are very large; the antennules with the joints of the peduncle flattened on their inferior surfaces, and with two flagella, of which the inner is nearly twice as long as the outer, but not as long as the cephalothorax. Antennæ with the flagella very long. The crowns of the mandibles are slightly concave on their inner surfaces, the cutting-edges thin, and with a tooth near the apex; the palpus tomentose and 2-articulate, the terminal joint foliate, triangular and acute. The second maxillipedes are densely hairy; the outer maxillipedes are very slender, almost styliform, and their exognathi reach almost to the extremity of the penultimate joint. The three anterior pairs of legs are small and very slender, successively slightly increasing in length, but the third pair not more robust than the preceding; they are very feebly didactyle, and the fingers are much shorter than the palmar portion of the hand; the fourth pair of legs are very feeble, and much shorter than the preceding; the fifth pair are obsolete, thickened, and two-jointed, the terminal joint constituting an indurated corneous lobe; there is also a small lobate prolongation at base of each of the fourth legs; and the lobe between the bases of fifth pair of legs (which resembles in form that usual

in the female of *Penæus*, but is not divided by a median fissure) is of the same corneous consistency. All the legs, except the fifth rudimentary pair, are furnished with an exopodite. There is a spine on the under surface of the second joint of the legs of the first three pairs, that on the third pair of legs very small.

*Hab.* Mangalur (Mangalore), west coast of India.

Collected by Dr. G. E. Dobson, to whom I have much pleasure in dedicating the species.

I have examined four specimens of this species, all of which are certainly females. One of these has been presented by Dr. Dobson to the trustees of the British Museum. The fact that no males have yet been observed renders it possible that the rudimentary and indurated condition of the fifth pair of legs may be peculiar to the female sex—an opinion shared both by Dr. Semper and Mr. Wood-Mason, who have seen the specimens; and as the mouth-appendages, although presenting some peculiarities, do not depart widely in structure from the type usual in *Penæus*, I think it advisable until more specimens shall have been examined, to retain the species in that genus. Should further researches, however, prove that the rudimentary condition of the fifth legs exists in both sexes, the name *Mangalura* may be adopted to designate the genus, which will be characterized not only by the above-mentioned character, but also by the triangular shape of the terminal joint of the mandibular palpus (which is less delicate and transparent in texture than is usual in *Penæus*), and the slender outer maxillipedes. The species will then stand as *Mangalura dobsoni*<sup>1</sup>.

The form of the fifth pair of legs is not analogous with that characteristic of the very different genus *Sergestes*, wherein these members, although rudimentary, are very slender, and similar in structure to the preceding pairs.

In the form of the rostrum *P. dobsoni* resembles the *Penæus sculptilis* of Heller, from Java (Voy. Novara, Crust. p. 122, pl. xi. fig. 1); but, besides the characters derived from the fourth and fifth pairs of legs, which are of the normal form in *P. sculptilis*, that species differs, if the figure be correct, in the much longer flagella of the antennules, and in the absence of a notch in the posterior margin on the sides of the first and second postabdominal segments, in the form of the first postabdominal segment, which is rounded at its

<sup>1</sup> Since writing the above, Professor Wood-Mason has discovered, among specimens of *P. dobsoni* from the same locality (Mangalore), a single male individual, in which he observed that the fifth legs are fully developed, and which, by his kindness, I am now enabled to figure (see Pl. XVII. fig. 2, f). It is of very small size, not much more than half as large as the females described by me, which it in all respects resembles, except in the fifth legs. These are very slender and elongated, longer, in fact, than those of the preceding pair, with the dactylus much shorter than the preceding joint. The fact, therefore, that the rudimentary condition of the fifth legs is a sexual character peculiar to the female may be regarded as definitely established; nor does it seem that this can possibly be accidental, or due to the loss of the legs and subsequent induration of the joint, as the indurated terminal lobe is of the same shape on both legs in all four of the specimens seen by me, and I have never observed a similar condition of the joint in any other specimen of the genus.



antero-inferior angle, &c. The sex of the specimens of *P. sculptilis* is not stated.

In the *P. avirostris*, Dana (U.S. Expl. Exp. xiii. Crust. i. p. 603, pl. xi. fig. 3, 1852), from Singapore, which is but shortly characterized, the rostrum is somewhat of the same form, but straighter, shorter, and only 6-toothed above, the legs of the two posterior pairs much more slender than the preceding (sex not stated). The cephalothorax is not dorsally carinate in its posterior half.

#### PENÆUS AFFINIS.

*Penæus affinis*, M.-Edw. Hist. Nat. Crust. ii. p. 416 (1837); De Haan, Faun. Japon. Crust. p. 192, pl. xlvi. fig. 3, *P. barbatus* (1849).

*Penæus velutinus*, Dana, U.S. Expl. Exp. xiii. Crust. i. p. 604, pl. xl. fig. 4 (1852).

Whether this species be the *P. affinis* of Milne-Edwards must remain uncertain, as his type specimen has not been figured, and his short description leaves many particulars unnoticed; but it is certainly the one figured by De Haan under the name of *P. barbatus*, and referred by him in the text to *P. affinis*. *P. velutinus* of Dana (U.S. Expl. Exp. xiii. Crust. i. p. 604, pl. xl. fig. 4, 1852) from Lahaina, Sandwich Islands, seems to be also referable to the same species. His description applies to it; and although his figure, when compared with that of De Haan, presents some slight differences, they are probably due to inaccuracies of drawing. Examples of this species are in the British-Museum collection from Japan, Sandy Cape, Sharks' Bay, West Australia, and the Gulf of Suez; hence it would appear to have a wide geographical range.

*P. constrictus*, Stimpson (Ann. Lyc. Nat. Hist. New York, x. nos. 4, 5, p. 135, 1871), from the coast of Carolina, U. S., of which there is one specimen in the British-Museum collection, presented by the Smithsonian Institution, is nearly allied to the above. The teeth of the rostrum are stated to be equidistant by Stimpson; but in the specimen I have examined, the last tooth is (as in *P. affinis*) separated by a wider interval than the preceding. It differs, however, in being much less pubescent (the postabdomen is naked and glossy), and in having a very deep longitudinal median sulcus on the last segment, which is margined by lateral carinæ.

*P. pubescens* of the same author (*l. c.* p. 133), based upon a single female example with imperfect rostrum from St. Thomas, would also seem from the description to be closely allied to *P. affinis*, and, in the absence of specimens for comparison, I am unable to say how it may be separated from that species. It will probably prove to be distinct, on account of the widely distant locality; therefore I do not quote it as a synonym of the Indo-Pacific form.

#### PENÆUS STYLIFERUS.

*Penæus styliferus*, M.-Edw. Hist. Nat. Crust. ii. p. 418 (1837).

There is a single specimen, a male, in bad condition, which I refer

with some hesitation to this species, in the Museum collection. The rostrum is of the form described by Milne-Edwards, but reaches but little beyond the peduncle of the antennules, and scarcely at all beyond the antennal scale. The fifth pair of legs is considerably longer than the preceding, and very slender; the dactylus small, of the usual form. This species cannot be the male sex of *P. dobsoni*, described above, as it differs in the form of the postabdominal segment, which is rounded at its antero-lateral angle, in the existence of spines on the lateral margins of the last postabdominal segment, &c. The median dorsal carina is prolonged to the posterior margin of the cephalothorax; and there is a raised lateral line on each side, extending from a point immediately above the antennal spine halfway to the posterior margin.

If the genus *Xiphopeneus* of Smith (Trans. Conn. Ac. ii. p. 26, 1871) be sustained, it will probably be necessary to refer this species to it, as it agrees in the form of the rostrum, and in the length of the legs of the fifth pair, although the dactylus is quite short.

#### PENÆUS KRÖYERI.

*Peneus kröyeri*, Heller, Wien. Akad. Wissensch. Sitzungsab. xlv. (Abth. i.), p. 425, pl. ii. fig. 51 (1862).

*Xiphopeneus harttii*, Smith, Trans. Conn. Ac. ii. p. 28, pl. i. fig. 1 (1871).

I have little hesitation in referring the *Xiphopeneus harttii* of Smith, from Caravelhas, Bahia, to the previously described *P. kröyeri* of Heller, from Rio Janeiro. A comparison of the figures and descriptions will, I think, suffice to establish their identity; and there is a specimen from the West Indies in the British-Museum collection which appears to belong to the same species. The genus *Xiphopeneus* was characterized by its author mainly by the long and slender antennules (which have a small lamelliform appendage which is not foliaceous and expanded over the eye as in *Penæus*), the form of the cephalothoracic sulci, and the great length of the fourth and fifth thoracic legs (which have the terminal joints slender and flagelliform or, rather, styliform). The mouth-organs, antennæ, &c. are not different from those of *Penæus*.

It will be seen that these characters are not of greater value than those which distinguish the *Penæi* of Milne-Edwards's first and second sections (which have never been considered of generic importance). Moreover the length of the posterior legs is certainly a character that varies in the different species; and in one (*P. styliferus*) already referred to, which agrees in most of its characters with *Xiphopeneus*, the dactylus of the fifth pair of legs is quite short. Nor do we know at present how far these peculiarities are dependent upon the sex of the animals (the specimens of *P. kröyeri* and *P. styliferus* in the Museum collection are both males).

If the genus *Xiphopeneus* be retained as distinct, it will be necessary to constitute more than one other new generic division for species hitherto included in *Penæus*; and as the materials at present existing

in the British-Museum collection do not enable me to adopt this course, as many species are not as yet represented in it, I have, in the synopsis of the species given below, and until a more complete revision of the genus shall have become possible, included the species in *Penæus*.

*Synoptic Table of the Species of Penæus.*

The object of the following analytical Table is to indicate the principal external characters by which the species of *Penæus* may be distinguished. There are certain species which have not been described with sufficient detail to allow of their incorporation in the list; these are either previously referred to, or are mentioned by Milne-Edwards in the 'Histoire Naturelle des Crustacés.' The species of which there are no specimens in the British-Museum collection, and which are therefore unknown to me, are distinguished by an asterisk.

- I. Antennules with both flagella extremely short. Two deep longitudinal sulci extending along the whole length of the cephalothorax, adjacent to the rostrum and the median carina, which is itself deeply sulcate. (A supraorbital spine present.)

First and second pairs of legs bispinose, third pair unispinose at base. Seventh postabdominal segment with lateral marginal spines.

1. *P. caramote*, Risso.

European.

First pair of legs bispinose, second pair unispinose, third pair unarmed at base. Terminal segment without lateral marginal spines.

2. *P. brasiliensis*, Latr.

Atlantic region.

First and second pair of legs unispinose, third pair unarmed at base. Terminal segment with lateral marginal spines.

3. *P. canaliculatus*, Oliv.

Indo-Pacific region.

- II. Antennules longer. No lateral sulci on the cephalothorax, bordering the rostrum and median carina. (Supra-orbital spine usually absent.)

A. *Rostrum much longer than the eyes, reaching nearly to, or beyond, the end of the antennal scale.*

a. *Carapace with a ridge extending backward from the origin of the rostrum to, or nearly to, the posterior margin of the cephalothorax.*

§ *The carina between the base of rostrum and posterior margin sulcate, and reaching to the posterior margin.*

First pair of legs bispinose, second pair unispinose, third pair unarmed at base. Rostrum  $\frac{7-8}{3}$ -dentate, third to sixth postabdominal segments keeled.

4. *P. semisulcatus*, De Haan.

Japan, Indo-Pacific region.

First and second pairs of legs unispinose, third pair unarmed at base. Rostrum  $\frac{8-9}{0}$ -dentate, curved upward toward the apex; third to sixth postabdominal segments keeled.

5. *P. hardwickii*, Miers.

Indian Seas.

Rostrum  $\frac{9}{0}$ -dentate, slightly ascending toward the apex. All the postabdominal segments keeled.

\*6. *P. sculptilis*, Heller.

Java.

§§ *The carina between the base of rostrum and posterior margin of the cephalothorax not sulcate, and often not reaching to the posterior margin.*

\* *Rostrum with the inferior margin dentate. (No lateral spines on last post-abdominal segment.)*

Rostrum  $\frac{9-10}{1-2}$ -dentate. Terminal segment ending in a long spine.

\*7. *P. setiferus*, Linn.

West Indies, east coast of North America.

Rostrum  $\frac{6-7}{3}$  dentate, not reaching beyond the antennal scale. Terminal segment acute.

8. *P. monodon*, Fabr.

Indian and Australian Seas.

Rostrum very slender and styliiform in its distal half,  $\frac{8-9}{4-5}$ -dentate and reaching slightly beyond the antennal scale.

9. *P. indicus*, M.-Edw.

Indo-Malayan Seas; Panama?

\*\* *Rostrum with the inferior margin entire.*

1. *Rostrum not reaching far beyond the end of the antennal scale.*

Rostrum ensiform, straight, 8-10-dentate above, the teeth extending along nearly the whole upper margin. Terminal postabdominal segment without lateral marginal spines.

10. *P. monoceros*, Fabr.

Indo-Malayan Seas.

Rostrum curved upward toward apex, 8-dentate above, dorsal carina reaching nearly to the posterior margin. Terminal segment as in *P. monoceros*.

\*11. *P. curvirostris*, Stimpson.

Japan, Simoda.

Rostrum robust, curved slightly upward, 8-9-dentate above, the last tooth situated on the dorsal carina at considerable distance from the preceding. Terminal segment with a pair of lateral spines.

12. *P. membranaceus*, Risso.

Mediterranean, Madeira.

Rostrum styliiform at apex, nearly straight, 7-9-dentate above in its proximal half. Terminal segment without lateral marginal spines; 5th legs (in the female) rudimentary.

13. *P. dobsoni*, Miers.

West Coast of India.

Rostrum slender, styliiform and produced at apex, 6-9-dentate above at its base. Terminal segment with prominent lateral marginal spines; 5th legs (in the male) long and slender, dactylus small.

14. *P. styliiferus*, Edw.

Bombay.

2. *Rostrum reaching far beyond the end of the antennal scale.*

Rostrum 9-10-dentate above; the 3-4 last teeth placed upon the slender styliiform distal half. Last postabdominal segment with lateral spines.

\*15. *P. foliaceus*, Risso.

Mediterranean.

Rostrum 6-dentate above, the styliiform distal portion without teeth. Terminal segment without lateral spines.

16. *P. kröyeri*, Heller.

Brazil West Indies.

b. *Cephalothorax without any median dorsal ridge. (Rostrum entire below.)*

Rostrum straight, dentate nearly to its apex; first tooth separated by a



wider interval than the preceding. Cephalothorax and postabdomen tomentosc. Terminal segment not carinate, with minute lateral spines.

17. *P. affinis*, Edw.

Indo-Pacific region.

Rostrum and cephalothorax as in *P. affinis*. Postabdomen naked. Terminal segment with the deep longitudinal median sulcus defined by lateral carinæ, and with lateral spinules.

18. *P. constrictus*, Stimpson.

East Coast United States.

Rostrum somewhat sinuated, 9-dentate above, with the teeth equidistant. Terminal segment without lateral spines.

\*19. *P. tenuis*, Dana.

North Patagonia.

Rostrum styliform toward apex, nearly straight, 6-dentate above near its base; the last tooth separated by a wider interval. Terminal segment without lateral marginal spines.

\*20. *P. avirostris*, Dana.

Singapore.

B. Rostrum very short, not reaching beyond the eyes.

\* Rostrum slender.

Eye-peduncles long. Rostrum not half as long as the eyes, 7-dentate above.

\*21. *P. podophthalmus*, Stimpson.

Hong Kong.

Eye-peduncles of moderate length. Rostrum a little shorter than the eyes, 5-dentate above.

\*22. *P. gracilis*, Dana.

Sooloo Sea.

Eye-peduncles thick. Rostrum scarcely reaching beyond them, 8-9-dentate above. (5th? legs greatly elongated, with the dactylus nearly half as long as the cephalothorax.)

\*23. *P. stenodactylus*, Stimpson.

Hong Kong.

\*\* Rostrum laminiiform, high, and laterally compressed.

Rostrum 9-10-dentate above. Flagella of the antennules half as long as the peduncle.

\*24. *P. lamellatus*, De Haan.

Japan.

Rostrum 6-dentate above. Flagella of the antennules about as long as the peduncle.

\*25. *P. brevicornis*, M.-Edw.

Indian Seas.

ARISTEUS EDWARDSIANUS. (Plate XVII. fig. 3.)

*Penæus edwardsianus*, Johnson, P. Z. S. 1867, p. 897.

The typical example of this very fine species is in the collection of the British Museum; and I have little hesitation in referring it to the genus *Aristeus* of Duvernoy (Ann. Sci. Nat., sér. 2, Zool. xv. p. 101, 1841). The character principally relied upon by Duvernoy for the distinction of the genus was derived from the ramose structure of the branchiæ, which he conceived were formed upon a different type from that found in other genera of the Caridea; but I am able, from an examination of the branchiæ of *A. edwardsianus*, to confirm Dana's observation that they do not differ essentially in struc-